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INDUSTRIAL ART BURSARIES COMPETITION

The winning and commended designs submitted in the 1955 Industrial Art Bursaries Competition which have already been displayed in London and Falmouth, as previously announced in the *Journal*, are at present on view at Belfast College of Art, Belfast. From 28th September to 15th October the Exhibition will be on view at the Birmingham College of Art and Crafts, Margaret Street, Birmingham, 3.

ROYAL DESIGNERS FOR INDUSTRY

The Master and members of the Faculty of Royal Designers for Industry held a Sherry party at the Society's House on Wednesday, 12th September, in connection with the International Design Congress, 'The Management of Design', held by the Council of Industrial Design this week. Among those who were invited were representatives of design organizations in eight continental countries.

FACILITIES FOR FELLOWS

Fellows are reminded that the accommodation which is available for their use at the Society's House includes the Library, which has a loan collection as well as a reference section, and the Parlour, which may be used as a reading and writing room and as a meeting place for themselves and their friends when in London.

Light refreshments, such as morning coffee, sandwiches and afternoon tea can be ordered between 10 a.m. and 5.30 p.m. on weekdays and until 12.30 p.m. on Saturdays.

T. H. HUXLEY AND TECHNICAL EDUCATION

A paper by

CYRIL BIBBY, M.A., M.Sc., Ph.D.,

read to the Society on Wednesday, 18th April, 1956,

with R. W. Holland, O.B.E., M.A., M.Sc., LL.D.,

Chairman of the Council of the Society, in the Chair

THE CHAIRMAN: Some of us in these days are prepared to say, 'and who was Thomas Henry Huxley?' Dr. Bibby is going to tell us about one angle of Huxley's activities. Huxley was, of course, a great biologist. At the age of 22 he was a member of an expedition that explored the Great Barrier Reef off the coast of Australia, and there he found much to remind him of his college work, and much to use afterwards for his further researches. As Professor of Natural Sciences at the Royal School of Mines, the forerunner of the Imperial College, he had plenty to do and plenty to think about, but he devoted himself very largely in all his spare moments to the idea that education was not complete if it were merely 'education for life'. In consequence he, as a very forceful man, a man who got away with it better than any other man that I have read about, was really the father in this country of proper technical education.

He was born in 1825, and it seems a long time ago. Yet he and I overlap, because on my bookshelves I have a prize which was won at a Mechanics' Institution, one of those which, of course, evolved themselves into the technical colleges of to-day. It was presented to me at a prize-giving by Huxley. He was then 68 years of age and he died two years later—not cause and effect!

Dr. Bibby is going to tell us of another aspect of Huxley's life, and Dr. Bibby has a right to speak because he, too, is a biologist, and he has read deeply into the multitudinous works that Huxley produced. There was no more prolific writer on biology and the philosophies arising therefrom than Thomas Huxley.

The following paper was then read:

THE PAPER

In his recent admirable study[1] of the aims, organization and future development of technical education, the Principal of Salford's Royal Technical College quotes from the address which T. H. Huxley gave in 1887 in neighbouring Manchester:

> . . . it passes the wit of man, so far as I know, to give a legal definition of technical education. If you expect to have an Act of Parliament with a definition which shall include all that ought to be included, and exclude all that ought to be excluded, I think you will have to wait a very long time[2].

But, unlike some who are always ready to use difficulties of definition as excuses for inaction, Huxley was impatient of procrastination.

> There is a well-worn adage, [he remarked], that those who set out upon a great enterprise would do well to count the cost. I am not sure that this is always true. I think that some of the very greatest enterprises in this world

> have been carried out successfully simply because the people who undertook them did not count the cost; and I am much of the opinion that, in this very case, the most instructive consideration for us is the cost of doing nothing[3].

Perhaps, at a time when Britain is lagging in the technological race of the nations, it may be instructive to examine the endeavours of one whose work for technical education was ever instinct with urgency.

It was rather over a century ago that the young T. H. Huxley began his career as junior lecturer at the Government School of Mines in Jermyn Street. At this school, through its migrations and metamorphoses, he was to spend his working life, in a technical institution destined to grow eventually into the mammoth Imperial College of Science and Technology; but it is mainly with his activities outside the School of Mines that we are now concerned. When this Society of Arts organized its Educational Exhibition at St. Martin's Hall, in Long Acre in 1854[4], Huxley spoke on the educational value of the natural history sciences[5]; and the Society's records show that, although he was never one of its leading members, Huxley's name keeps cropping up in its activities. Thus, we find him[6] interested in subjects so varied as submarine telegraphy, steamships, modes of preserving meat, and the fish supplies of England; and, more to our present purpose[7], participating in the Society's 1868 Conference on Technical Education, helping to organize the Educational Division of the Exhibition of 1871, serving on the Society's Technical Examinations Committee, speaking at the first Congress on Domestic Economy organized by the Society in Birmingham, and taking the chair for Sylvanus Thompson's 1879 paper on 'Apprenticeship: Scientific and Unscientific'.

The two-day conference held in these rooms on 23rd and 24th January, 1868, proved to be an important milestone in the history of technical education. As far back as 1830 Charles Babbage, the inventor of the calculating machine, had lamented[8]

> that a country, eminently distinguished for its mechanical and manufacturing ingenuity, should be indifferent to the progress of inquiries which form the highest departments of that knowledge on whose more elementary truths its wealth and rank depend.

And by 1865 a literary man like Ruskin was similarly complaining[9] that

> We are glad enough . . . to make our profit of science; we snap up anything in the way of a scientific bone that has meat on it, eagerly enough; but if the scientific man comes for a bone or a crust to *us*, that is another story.

But, despite the early attempts at technical education in the Mechanics' Institutes (that of London founded when stage-coaches were still leaving the Saracen's Head for all parts of the land), despite the establishment of Queenswood as a technical school with Tyndall and Frankland among its teachers, despite the establishment of a Chair of Technology at Edinburgh University in 1855, there could be no real advance until the masses of the people were provided with some sort of general education by Forster's Education Act of 1870. Nevertheless, the 1867 Paris Industrial Exposition had underlined the lesson of the Great Exhibition of 1851; and when, following the conference of the Society of Arts,

the House of Commons appointed the 1868 Select Committee on Scientific Instruction, it was to ears well attuned that Huxley and many others played on the theme of the urgent need for technical education.

The immediate result of this Society's conference was the setting up of its Committee on Technical Education, and Huxley was one of the sub-committee appointed[10], 'to prepare a Scheme for Technical Education calculated to promote the advancement of Arts, Manufactures, and Commerce in this Country'. Huxley seems[11] to have been but a poor attender at its meetings, but no one who knows anything of his genius for lobbying and string-pulling will imagine that this indicates any lack of influence on its proceedings. In 1870, when to avoid wasteful duplication the Society abandoned its examinations in subjects covered by those of the Science and Art Department, there was a move to give up examinations altogether; however, Donnelly and Huxley and others succeeded in establishing the technological examinations, many of which were eventually handed over to the City and Guilds Institute which still conducts them.

One of the agenda of the January Conference had been to consider 'how far technical education can be provided by the aid of existing endowments', and it was to the wealthy City Guilds that Huxley now turned his attention. In 1869, sensitive to the continual muttering that the vast endowments of the Liveries should be put to some useful purpose, the *City Press* admitted[12] that there was no good reason why they should not be devoted to education; and a year later[13] the Lord Mayor presided over a meeting in Common Hall, which unanimously resolved

> . . . to continue its efforts to induce the Livery Companies to adopt measures for promoting technical education, exhibitions, and other means tending to advance the progress and well-being of the various arts and vocations, ostensibly represented by those companies.

In 1870 England was wide awake to its educational needs—to breathe the air of those days it is well to repair to the Royal Albert Hall, built originally not for Promenade concerts but[14] as 'a central point of union where men of science and art could meet, where the results of their labours could be communicated and discussed . . .', and read the words of the great frieze inscription: 'This Hall was erected for the advancement of the arts and sciences, and for the works of industry of all nations, in fulfilment of the intentions of Albert, Prince Consort'. Soon the Lord Mayor was receiving a deputation to urge Thomas Twining's scheme for a 'National University for Industrial and Technical Training'[15], even Gladstone suggested that the Companies might use some of their wealth for technical education[16], and the time was ripe for Huxley to capitalize those assets of goodwill which, as his diaries and correspondence show, he had long been accumulating in City circles.

Over a period of years Huxley's name had appeared[17] in the guest lists of Mansion House banquets, and it would be out of character if in conversation through the courses he did not tie a few strings for later pulling. After 1870, when the new and as yet homeless London School Board met in the Guildhall under Alderman Cotton of the Haberdashers' Company, Huxley's name figures

more prominently in the reports of City feasts; and, at the Haberdashers' banquet early in 1875 to 'upwards of 150 noblemen and gentlemen'[18], only the Lord Mayor, the Vice-President of the Privy Council and the Senior Charity Commissioner had precedence over him. From then on, Huxley was *persona gratissima* to the Livery. So it is not surprising that, when in 1876 the City Corporation and Companies agreed[19] to pay attention 'to the promotion of Education . . . throughout the country, and especially to technical education', Huxley was one of those to whom the specially constituted committee turned for advice. When he spoke in this Society's rooms to the Working Men's Club and Institute Union on 1st December, 1877, on the subject of technical education, he was able to announce with some gratification[20] that 'Those powerful and wealthy societies, the livery companies of the City of London, remembering that they are the heirs and representatives of the trade guilds of the Middle Ages, are interesting themselves in the question'. And, remembering that the lead in this movement was taken by the Drapers and Clothworkers and Goldsmiths, we may perhaps see some significance in the fact that Huxley's diary for 1878 records engagements with these three very companies. It was not for nothing that, at the Drapers' banquet of 1878, Huxley's name was coupled with the toast of 'Science and Art', and he was thanked[21] for the 'very able advice' which he had given to the Guilds' executive committee; and five years later Sir Frederick Bramwell, Prime Warden of the Goldsmiths' Company, recalled[22] how 'When eleven of the Livery companies . . . selected six men of repute . . . and asked them to tell the companies how they could best accomplish their object . . . for good common sense and scientific instruction, Professor Huxley's report was the best'. The outcome of this advice was a recommendation by the executive committee[23], that the Guilds should spend £30,000 in building a new central technical institution ('regard being had primarily—as Professor Huxley suggests—rather to what is wanted in the inside than what will look well from the outside'), £10,000 per annum on salaries, and £20,000 each year on exhibitions and other technical classes and schools. This was the beginning of a great work, and one of its leading members declared[24] that Huxley was 'really the engineer of the City and Guilds Institute; for without his advice we should not have known what to have done'.

Before long a battle was raging about the best situation for the proposed technical college, which had originally been envisaged[25] as being built somewhere in the City. It was at the request of Sir Owen Roberts, Clerk to the Clothworkers, that Huxley[26] prepared a report on the suitability of the site of Kensington House; and, when the press began to blame him for seeking to set the college far out in the suburb of Kensington, he insisted[27] that 'So long as the College is established it is all one to me whether it is at Mile End or at Battersea or at any intermediate spot'. Ever urgent, Huxley was not content to sit back and let events take their slow unaided course: when in December 1879 he presided for Sylvanus Thompson in this Society's rooms, he took the opportunity[28] to remind the Guilds that they 'possessed enormous wealth, which had been left to them for the benefit of the trades they represent . . . that they were morally

bound to do this work, and he hoped if they continued to neglect the obligation they would be legally compelled to do it'. 'If the people did not insist on the wealth being applied to its proper purpose', he went on, 'they deserved to be taxed down to their shoes'. Continuing his campaign by letters to *The Times*, he complained[29] that 'Whether the Guilds have adopted the recommendations of their own Committee or whether they have rejected them is unknown to the outside world', and he pointed out bitterly that

> The inmost financial secrets of the Church and of the colleges of Oxford and Cambridge have been laid bare by those universal solvents, Royal Commissions; but no Government which has existed in this country for the last century has been strong enough to apply such *aqua regia* to the strong-boxes of the City Guilds.

Huxley, of course, knew perfectly well the way things were going, and it seems likely, if we may judge from a letter[30] to the old Chartist George Howell, that his communication to *The Times* was a carefully calculated provocation:

> I suppose I have some ten years of activity left in me, and you may depend upon it I shall lose no chance of striking a blow for the cause I have at heart. . . . The animal is moving and by a judicious exhibition of carrots in front and kicks behind, we shall get him into a fine trot presently. . . . The (City) Companies should be constantly reminded that a storm is brewing. There are excellent men among them, who want to do what is right, and need help against the sluggards and reactionaries. It will be best for me to be quiet for a while, but you will understand that I am watching for the turn of events.

Huxley's watching was facilitated when early in 1881 he became Inspector of Salmon Fisheries and found new opportunities to lobby the Liveries. Apart from his continued attendance[31] at Mansion House dinners, he paid many visits, as his diaries for 1881 to 1883 show, to the Fishmongers' and Salters' Companies; and, since his correspondence at this time with Donnelly[32] and others refers frequently to technical education, presumably he did not confine his conversation to his formal business as Fisheries Inspector. At any rate, he must have been gratified, at the Fishmongers' banquet of 1881[33], to hear the Lord Mayor refer to the forthcoming laying of the foundation stone of the Finsbury Technical College. And when, two years later, he was asked to accept the Salters' Freedom, the Master of the Company wrote[34] to say:

> I think you must admit that the City Companies have yielded liberally to the gentle compression you have exercised on them . . . we propose to legitimise your claim for education, which several of us shall be willing to unite with you in promoting.

It was on 10th May, 1881, that the Duke of Albany laid the foundation stone of the Finsbury College, and on 18th July of the same year the Prince of Wales set the foundation column of the Central Institution at South Kensington. By autumn, the 'City and Guilds of London Institute for the Advancement of Technical Education' was advertising[35] courses of Technical Chemistry under Armstrong and Technical Physics under Ayrton at Finsbury; on 13th February, 1883, the Finsbury College was formally opened; on 28th June, 1884, the South Kensington College (on which some £95,000 had been spent) was opened: and

when Huxley delivered his Presidential Address to the Royal Society in 1885 he was able to announce[36] that 'About 250 technical classes in different parts of the kingdom are now affiliated to the Institute, and some of them are already developing into efficient technical schools'.

The subsequent history of the City and Guilds Institute and its technical colleges need not concern us here, but it is perhaps worth while to examine Huxley's hopes—in the event unrealized—for the Imperial Institute. The Prince of Wales suggested to the Lord Mayor[37] that Queen Victoria's Jubilee Year might be worthily marked by the foundation of a great central industrial institution in London, and soon the press was buzzing with rumours of what the Prince's committee was proposing. Everyone felt that the projected Imperial Institute should in some way cement the common commercial interests of the Empire's far-flung territories, but no one seemed to have any very clear idea of the form it should take. No one, that is, except Huxley, who soon became the centre of a riproaring controversy. It appears to have been almost by accident—if anything which he did was ever entirely accidental—that Huxley became involved. Being told[38] that the Prince of Wales would esteem it a favour if he would speak at a meeting in the City on 12th January, 1887, he agreed to do so although physically unfit. There seems[39] to have been some muddle about the resolution he was to speak on, and no intention that his part should be a major one in the proceedings, but it was his contribution which caught the public ear. 'With the exception of Professor Huxley, whose interesting speech we give in full elsewhere', the *Pall Mall Gazette* informed its readers[40], 'everybody was dull, stale, and unprofitable'. Unlike most others, he knew exactly what he wanted and set about trying to get it.

Within the week he had written to *The Times*[41] that he had no enthusiasm for 'the establishment of a vast permanent bazaar', but wished for 'something which should play the same part in regard to the advancement of industrial knowledge which has been played with regard to science and learning in general, in these realms, by the Royal Society and the Universities'. As he had put it in his Mansion House speech[42]:

> Within the last thirty years . . . there began, in the first place, a slight flirtation between science and industry, and that flirtation had grown into an intimacy, he might almost say courtship, until those who watched the signs of the times saw that it was high time that the young couple married, and set up an establishment for themselves. This great scheme from his point of view was the public and ceremonial marriage of science and industry.

Or, as he told Herbert Spencer[43], 'the "Institute" might be made into something very useful and greatly wanted—if only the projectors could be made to believe that they had always intended to do that which your humble servant wants done'.

Huxley's letter to *The Times*—in which, incidentally, he argued that the Imperial Institute should be not out at South Kensington but in the City where it would be convenient for those engaged in commerce—envisaged the new institution as

> a place in which the fullest stores of industrial knowledge would be made accessible to the public; in which the higher questions of commerce and

> industry would be systematically studied and elucidated; and where, as in an industrial university, the whole technical education of the country might find its centre and crown.

But, although the committee issued a pamphlet officially adopting Huxley's definition of the functions of the new Institute, this was an occasion when he did not get his way. The cost of a City site proved prohibitive, the Imperial Institute was built in South Kensington where Huxley said[44] it had as much chance of serving the interests of commerce and industry as a fish had of thriving out of water, and history has shown how nearly right he was when he wrote to Michael Foster[45]: 'The thing is already a failure. I daresay it will go on and be varnished into a simulacrum of success—to become eventually a ghost like the Albert Hall or revive as a tea garden'.

But if 1887 saw the collapse of Huxley's hopes for the Imperial Institute, that year saw also the formation of the National Association for the Advancement of Technical Education, at whose preliminary meeting Huxley was one of the speakers[46], and for which he spoke at the great meeting in Manchester Town Hall on 29th November. Only ten days before, to his own and his wife's ill-health there was added the crushing blow of the death of his daughter Marian, and his friends[47] tried to dissuade him from keeping the engagement. But, as Huxley explained[48]:

> I am not proud of chalking up 'no popery' and running away . . . and, having done a good deal to stir up the Technical Education business and the formation of the Association, I cannot leave them in the lurch when they urgently ask for my services.

It is this Manchester speech, published in his *Collected Essays*, which is usually referred to for Huxley's views on technical education, but much more information is available from other sources, both published and unpublished.

In those days, as to-day, there was dispute about the extent to which technical education should include non-vocational general education. Sir Philip Magnus, for example, held that 'The special education, the object of which is to train persons in the arts and sciences that underly the practice of some trade or profession, is technical education'[49], while Sylvanus Thompson asserted[50] that 'Education is technical only so far as it is directed to the training of the individual in and for his business in life'. With such narrow views Huxley would have no truck. Believing[51] that 'Although it was a great thing to make skilled workmen, yet it was much more important to make intelligent men', he was vividly aware that what could be achieved by purely technical instruction depended upon all sorts of wider educational and social circumstances. Perhaps the most succinct statement of his views is to be found in some notes which he drew up in 1887 for the Charity Commissioners[52]:

> Technical education in its strictest sense, is only one of a number of conditions or operations on which the full development of the Industrial productibility of any body of men depends.
>
> These are
>
> I. Elementary school education as a preparation for life in general.

II. Technical education proper as a preparation for special callings, consisting of
  A. Preparatory Instruction in Science and Art.
  B. Special technological Instruction.
  C. Training and providing teachers in A and B.
III. Contributory agencies
  A. Capacity catching apparatus.
  B. Physical and moral training.

He therefore attached a very broad sense to technical education, which he took to cover[53] 'all those means by which the productive capacity of an industrial population may be fully and permanently developed'. It was for this reason that he urged on the Charity Commissioners[54], 'the provision of baths, gymnasia, cookery schools, free libraries, reading rooms and of innocent amusements as a contribution to industrial development of prime importance'. It is as true to-day as when Huxley insisted on it at Manchester[55] that

> Our sole chance of succeeding in a competition, which must constantly become more and more severe, is that our people shall not only have the knowledge and the skill which are required, but that they shall have the will and the energy and the honesty, without which neither knowledge nor skill can be of any permanent avail.

Holding such wide and liberal views, Huxley not surprisingly opposed those who would have introduced vocational instruction into the ordinary elementary schools. These, he held,[56] were 'already charged with quite as much as they can do properly'; and the attitude which he took with the Working Men's Club and Institute Union[57] anticipates the trend of recent years:

> Well, but, you will say, this is Hamlet with the Prince of Denmark left out; your 'technical education' is simply a good education, with more attention to physical science, to drawing, and to modern languages than is common, and there is nothing specially technical about it.
>
> Exactly so; that remark takes us straight to the heart of what I have to say; which is, that, in my judgment, the preparatory education of the handicraftsman ought to have nothing of what is ordinarily understood by 'technical' about it.

On the other hand, once the earlier stages of education were traversed and the worker was faced with the achievement of skill in his particular occupation, Huxley would have him concentrate his attention on that objective as closely as possible. He believed that a firm seat could be found on two stools, general education and special education, and he did not propose to fall between them. So at Manchester he urged[58] the value of schools attached to factories, 'where the employer has an interest in seeing that the instruction given is of a thoroughly practical kind', while the so-called 'trade school' he criticised as 'apt to be too amateurish' and as not preparing the worker 'for the real conditions under which he will have to carry out his work' Or, as he put it to the Easingwold Agricultural Club when it asked his advice on agricultural education[59], 'practice can be learned only by practice. The farmer must be made by and through farm work'. Therefore—and the principle surely applies whatever the technicality—if framing an educational course for future farmers

> I am not sure that I should attempt chemistry, or botany, or physiology or geology, as such [but would teach] the history of a bean, of a grain of wheat,

of a turnip, of a sheep, of a pig, or of a cow properly treated—with the introduction of the elements of chemistry, physiology, and so on as they come in.

When we come to consider the question of the higher technical, or technological education, we find again that Huxley's views have some relevance for to-day. Always intensely concerned for the achievement of high professional standards, he urged as early as 1861[60] that there should be established a corporate college which might 'stand in exactly the same relation to the Mining, Metallurgical and Geological professions as the Royal College of Surgeons to the Medical prof.'—a proposal repeated, in a rather wider context, in the recent suggestion of the National Advisory Council on Education for Industry and Commerce[61] that there should be instituted a corporate Royal College of Technologists. The analogy with the medical profession came very naturally to Huxley, who was so far free from the gentlemanly ideal of education as to be ever castigating[62] 'the mischievous delusion that brainwork is, in itself, and apart from its quality, a nobler or more respectable thing than handwork'. He has sometimes been criticized because[63] he regarded 'medicine, law and theology as technical specialities': however, it was not that he took a low and narrow view of professional education but that he took a high and wide view of technical education. For a long time, suspicious of the reactionary and clerical control of the universities, he opposed the handing over of higher technical institutions to them, but towards the end of his life he felt that the time had come when this could safely be done. There is in his remains a fascinating scheme for the reorganization of the University of London[64], which envisaged the formation of federal institutions for giving professional education in law, medicine, the industrial professions, the scholastic profession, painting, sculpture and architecture and music. Each of these federal colleges would devise its own schemes of instruction and examination, and present its students to the university for the award of degrees on an *ad eundem* basis. More than half a century after Huxley penned this scheme, something very like it was devised in the new university institutes of education for the profession of teaching: is it possible, I wonder, that these same notes provide the answer to the much debated problem of the relationship of colleges of technology and universities? I know very little about technical education, but during the last few years I have learned a lot about T. H. Huxley, and it will surprise me greatly if he does not prove worthy of close study by those whose special concern is technical education.

DISCUSSION

THE CHAIRMAN: In all that Dr. Bibby has told us about Professor Huxley, there is much upon which we could talk for quite a considerable time. We could point to Huxley's inconsistencies when he at first did not care whether his new college was in Mile End or at Battersea or anywhere in between, and yet at a later stage fell out with people because it had to be in Kensington and could not be midway because of the expense of building on City lands.

At the same time, Huxley's views were ahead of his time, and how refreshing it is to learn that technical education did not mean to him merely the teaching of techniques; that it meant a fundamental training, a knowledge of the world and the ability to

understand men and principles rather than of the practical mechanical techniques of business. Maybe there are some of you who would disagree, but I agree mainly with Huxley's point of view. You may say 'who are you to agree with Huxley?' He has been a long time dead; I think one is entitled to put it in that way. Again, one would be of the opinion that Huxley's views might very well be closely examined in relation to technological as distinct from technical education. There is no harm in examining things of the past to see if the future can benefit from them.

My memory goes back sufficiently far to know that the very things that Huxley suggested for his technical schools—that is that a man should not necessarily be taught in agriculture the chemistry of soils, but rather about the bean and how it germinated, and about corn and the oxen on the land—used to be taught in elementary schools. I went to one, and in the elementary school of my day they had something that was called an object lesson. They got a picture of a camel, and explained all about its various stomachs, the way that it lived and so on; they showed a picture of a wheatfield, and an illustration of the grain with a picture of the germ in the grain. So we might go on for ages to pick up little points in what our lecturer has told us and talk until we were at our starting point again.

DR. J. VARGAS EYRE: Notwithstanding a certain amount of canalizing to the chosen theme of this interesting paper nothing has been said to change the view that the greatness of T. H. Huxley rests more particularly upon his eloquence. He was, of course, a natural observer, who lived at a time when oratory was all the thing; indeed, his eloquence resulted from a painstaking cultivation. He was a preacher, not a doer, and like the physicians of his time he diagnosed but offered no treatment. His love of words often bewildered those who sought to be precise, and makes it difficult now to resolve his statements, yet easy to develop from them. Huxley's pioneering work in the field of education was particularly directed to a broadening of the instruction given in schools, to secure the inclusion of both science and art in the instruction given, so as to provide what he called a 'liberal education'.

It was Mr. William Gladstone who, during his second term of office as Prime Minister, being anxious to improve British trade, brought pressure to bear upon the Guilds of London to use their wealth for its original purpose, namely education and technical education. Some guilds refused to have anything to do with technical education for nobody could tell them what it was. But some of the more wealthy guilds understood the significance of the pressure and undertook to develop technical education without knowing what it was, or how to set about it. Huxley was one of the six eminent people who were consulted, and without doubt the general advice given in his report was of the greatest help in the remarkable and successful adventure of the City and Guilds of London into the unexplored field of technical education.

Although one or two matters of this kind do not seem to square with what the lecturer has said, Huxley was a great man, and it is appropriate to come together from time to time to consider the work and influence of great men. I am glad of the opportunity this paper has given us.

A vote of thanks to the Lecturer was carried with acclamation, and the meeting then ended.

REFERENCES

1. P. F. R. Venables, *Technical Education: Its Aims, Organisation and Future Development*, London, Bell, 1955, p.3.
2. T. H. Huxley, *Collected Essays*, III, London, Macmillan, 1893, p. 440.
3. *Ibid.*, p. 428.
4. *Journal of Society of Arts*, II, p. 621 *et seq.*
5. *T. H. Huxley, Op. Cit.*, III, p. 38.
6. *J. S. A.*, XI, p. 223; XIV, p. 239; XIX, p.149; XXX, p. 711.
7. *Ibid.*, XIV, p. 183; Minutes of Committees of Society of Arts, 1869-70, pp. 203-223; 1871-73, p. 20; *J. S. A.*, XXV, *passim*; *Educational Times*, XXV, p. 96.
8. Charles Foster, *The Influence of Science Teaching, etc.*, Ph.D. Thesis, University of London, 1940, p. 145.
9. John Ruskin, *Sesame and Lilies*, 1865, Cleartype edn. London, Collins, p. 67.

10. *M. of C. of S. of A.*, 1866-68, p. 327.
11. *Ibid.*, *passim*.
12. *City Press*, 26.vi.69.
13. *Ibid.*, 8.x.70.
14. T. L. Humberstone, *University Reform in London*, London, Allen & Unwin, 1926, p. 74.
15. *City Press*, 8.x.70.
16. *Ibid.*, 5.xi.70.
17. *Ibid.*, 1.vi.61 ; 24.vii.69.
18. *Ibid.*, 17.ii.75.
19. *Centenary of Imperial College, etc.*, no date or publisher given, p. 16.
20. *T. H. Huxley, Op. Cit.*, III, p. 425.
21. *City Press*, 2.iii.78.
22. *Ibid.*, 10.xii.83.
23. *Guildhall Library, Folio Pamphlet* 29.
24. *Life and Letters of T. H. Huxley*, I, p. 474, Ed. Leonard Huxley, London, Macmillan, 1900.
25. *G. L., F.P.* 29.
26. *Huxley Papers*, 25, 116 ; 25, 119. Sir Owen Roberts to Huxley, 29.x.79 ; 27.x.79.
27. *Ibid.*, p. 15, p. 152. Huxley to Editor of *Echo*, 30.xii.79.
28. *Nature*, XXI, p. 139.
29. *Times*, 15.xii.79 (also 29.xii.79).
30. *Life and Letters*, I, p. 475.
31. *City Press*, 6.viii.81 ; 7.vi.82. et al.
32. *H.P.*, p. 14, p. 22. Sir John Donelly to Huxley, 8.i.81.
33. *City Press*, 30.iv.81.
34. *H. P.*, p. 12, p. 207. F. Le Gros Clark to Huxley, 17.viii.83.
35. *City Press*, 13.viii.81.
36. *Nature*, XXXIII, 115.
37. *Seventh Report of the Commissioners for the Exhibition of* 1851, London, H.M.S.O., 1889, p. 26.
38. *H. P.*, 24, 144. Baron Playfair to Huxley, 1.i.86.
39. *Ibid.*, p. 42, p. 157 verso. MS. note by Huxley.
40. *Pall Mall Gazette*, 13.i.87.
41. *Times*, 20.i.87.
42. *Pall Mall Gazette, Loc. Cit.*
43. *Life and Letters*, II, p. 151.
44. *Times*, 19.ii.87.
45. *Life and Letters*, II, p. 154.
46. *H. P.*, p. 26, p. 126. Sir Swine Smith to Huxley, 22.vii.88.
47. *Ibid.*, p. 14, p. 83. Donelly to Huxley, 21.xi.87.
48. *Life and Letters*, II, p. 180.
49. Philip Magnus, *Industrial Education*, London, Kegan Paul, 1888, p. 20.
50. *Report of the International Congress on Technical Education*, Trounce, London, 1897, p. 141.
51. *Nature*, XXI, p. 139.
52. *H. P.*, p. 42, p. 52. MS. notes by Huxley.
53. *Ibid.*, p. 42, p. 58. MS. draft of address by Huxley.
54. *H. P.*, p. 42, p. 52.
55. *T. H. Huxley, Op. Cit.*, III, p. 446.
56. *Ibid.*, p. 433.
57. *Ibid.*, p. 411.
58. *Ibid.*, p. 437.
59. *Yorkshire Herald*, 11.iv.91.
60. *H. P.*, p. 30, p. 56. Huxley to Lord Granville, 13.vi.61.
61. *P. F. R. Venables, Op. Cit.*, p. 472.
62. *T. H. Huxley, Op. Cit.*, III, p. 425.
63. *Life and Letters*, II, p. 308.
64. *H. P.*, p. 42, p. 110. MS. notes by Huxley.

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EXAMINATIONS: DO WE STILL NEED THEM?

A paper by

SIR GRIFFITH WILLIAMS, K.B.E., C.B.,

a Member of Council of the Society and former Deputy Secretary, Ministry of Education, read to the Society on Wednesday, 30th May, 1956, with Sir Edward Crowe, K.C.M.G., a Vice-President of the Society and Chairman of its Examinations Committee, in the Chair

THE CHAIRMAN: May I introduce to you Sir Griffith Williams, who is going to speak on the subject of 'Examinations: do we still need them?'

All of you who are interested in education must have known Sir Griffith for many years. He has been associated with what used to be called the Board of Education and is now the Ministry of Education for the whole of his career in the Civil Service; and it is an interesting fact that he got into the Service without ever passing an examination. He was taken into the Ministry of Education by nomination. Sir Stanley Leathers, that eminent man, saw him and said, 'this is the sort of man we want', and there and then he took him into the Service.

He was in the Ministry for many years; was there as Principal Private Secretary to successive Presidents and he finished up as Deputy Secretary. During all that time he was well known as a most efficient Civil Servant, not only in the Ministry, but outside.

During the war I was a colleague of his on the Fleming Committee, the Committee on Public Schools over which Lord Fleming presided. That was a very important Committee from an educational point of view, and on that Committee Sir Griffith—he was then known as 'G.G.'—was the life and soul of the party. Everybody on that Committee would consult him, and he knew all the answers. If he had only lived in America he would have been a very rich man because he would have won one $64,000 competition after another!

The following paper was then read:

THE PAPER

The surprising thing about examinations is their novelty. The idea of testing people to find out what they are worth is, of course, almost as old as history. In the Old Testament the word is commonly used in this sense. Belshazzar, the King of Babylon, was told on the occasion of his impious feast that 'he had been weighed in the balances and found wanting'. The very word 'examination' comes from a Latin word meaning the tongue of a balance. From this original meaning the word came to mean a trial or test. In the 26th Psalm, we find the words 'Examine me O Lord and prove me; try out my reins and my heart'. The idea of weighing or testing a person is of great antiquity and persisted up till quite modern times. What is novel is the idea that a written examination can assess, not only professional qualifications, but also general capacity, aptitudes

and abilities. That somewhat ingenuous idea emerged with the other doctrinaire ideas of the eighteenth century and flourished in the nineteenth century. It is perhaps not surprising that in our times—more enlightened in some ways, certainly more sceptical of objective truth—we have come to doubt the value of examinations. It may be convenient to trace briefly this evolution beginning with the Middle Ages and ending with our own times.

THE RELIGIOUS PHASE

In mediæval times education and professional advancement lay through the Church, which recognized its duty to provide free education for suitable boys and girls. Monasteries, generally, had three types of school—oblate schools to prepare scholars for their profession as members of the community; almonry schools to provide education for suitable outsiders in the locality; and song schools for the education of choristers. Secular Cathedral foundations also had their schools and it was the custom for pious founders to leave money for Chantry masses which attracted teachers and scholars. In such a system there was little scope for competitive examinations; apart from a simple test of competence the pupils were selected by nomination.

Nor is there much evidence of examinations at the universities. At the famous law school of Bologna, for example, which was flourishing by about A.D. 1000, degrees were conferred after a private and public test in the course of which candidates had to study set pieces and answer questions on them orally. At Oxford, candidates for a degree were required to swear that they had read certain prescribed books and a panel of nine Regent-masters had to certify that they had reached a suitable stage of proficiency.

THE CHARITABLE PHASE

Nor was there much change when the era of school building began in the fifteenth century. The great foundations of Eton and Winchester were founded by King Henry VI and William of Wykeham with special provision for seventy scholars drawn from the class described as 'poor and needy'. Meantime, private benefactors founded grammar schools to provide education mainly for the local inhabitants, so that by the later Middle Ages there were some 300 grammar schools in the country. Broadly speaking, any qualified pupils who lived in the immediate neighbourhood could be admitted to these schools, but there were special grounds of preference—for example, Founder's Kin—and it became a growing practice for well-to-do boys and girls from a distance to be accepted as 'foreigners' at an economic fee. With a few exceptions such as Westminster, where scholars had always been selected by a competition known as the Challenge, entrance examinations as we have them to-day were still unknown.

THE COMPETITIVE PHASE

It may be said therefore that up to the beginning of the eighteenth century written examinations were comparatively unknown. There is a tradition that the

first written examinations were introduced at Trinity College, Cambridge, by Richard Bentley in 1702. Thirty years afterwards the old mediæval disputations were replaced at Cambridge by written examinations in the Mathematical Tripos. Oxford made no change until the beginning of the next century. Meantime, several factors were continuing to put a premium on open competition. The Industrial Revolution brought into play a new spirit of rivalry in the social and industrial field. The ideas of Jeremy Bentham and his disciples gave a new turn to examinations in the public services. In 1855 the Civil Service Commission was made responsible for selecting candidates for the Home and Indian Civil Services, and 15 years later the services were thrown open to free competition. About the middle of the nineteenth century restrictions on the election of scholars and fellows at Oxford and Cambridge were removed, and soon afterwards the Clarendon Commission recommended that scholarships at public schools should be thrown open to all on the basis of merit. More important than either, however, was the rapid growth of local examinations for schools organized by the universities and other bodies. In 1858 Oxford and Cambridge set up local examination delegacies for holding Senior and Junior local examinations in schools and later the Oxford and Cambridge Joint Board was established with its Higher and Lower Certificates. Added to these local examinations were the examinations held by the College of Preceptors, the Society of Arts, the Science and Art Department, and the London Chamber of Commerce. Competition had taken possession of the field. It was the age of ruthless efficiency and brute merit. As John Morley has put it in his life of Gladstone 'The lazy doctrine that men are much of a muchness gave way to a higher respect for merit and to more effectual standards of competency'.

THE EVIDENCE OF TROLLOPE

The tyranny of competitive examinations did not go without protest. Anthony Trollope, in his *Autobiography*, published in 1883, describes the process by which he was examined for the Civil Service and makes some relevant remarks on the system of competition. He wrote:

> The rule of the present day is that every place shall be open to public competition and that it shall be given to the best among the comers. I object to this, that at present there exists no known mode of learning who is best, and that the method employed has no tendency to elicit the best. That method pretends only to decide who among a certain number of lads will best answer a string of questions. There might have been—and in some future time of still increased wisdom, there may yet be—a department established to test the fitness of acolytes without recourse to the dangerous optimism of competitive choice.

Trollope then lays down a principle which is of striking significance to us living the best part of a century later.

> The gates of the one class should be open to the other: but neither to the one class nor to the other can good be done by declaring that there are no gates, no barriers, no difference. The system of competitive examination is, I think, based on a supposition that there is no difference.

THE PHASE OF RECONSTRUCTION

The year 1902 marked the beginning of a new epoch. In that year the second of our great Education Acts was passed and a rapid expansion of higher education began. But with the rapid growth of schools the multitude of examinations remained. The land was hag-ridden by examinations. Pupils who wanted to qualify for this or that profession or to enter the university had to sit for the appropriate entrance tests and, if they wanted further credentials as a passport to commerce and industry, they were advised to add yet other certificates. Heads of schools encouraged this system because it reflected credit on the school, and speech days were often enlivened by a catalogue of senior and junior local successes. It is recorded that one grammar school had 23 honours boards round the walls covered with the names of successful candidates in the locals and the late Sir Cyril Norwood, who was then Headmaster of Bristol Grammar School, has left it on record that to meet the wishes of the parents he would have had to organize ten separate examination forms each preparing for a different syllabus. It is not surprising that with such a multitude of different examinations it was no easy matter to get competent examiners and some of them were distinctly odd.

School examinations were in fact becoming a stranglehold on the schools and in 1911 the Consultative Committee was charged to examine the whole position. They recommended that, in place of the various local examinations, there should be a single School Certificate to be taken at about 16, and a Higher Certificate examination to be taken a year or two later. The idea was that these examinations should serve all purposes and make it unnecessary for pupils to sit for a variety of different tests according to their future intentions.

It took six years for these recommendations to bear fruit, but in 1917 eight university examining bodies were set up to examine pupils in the School and Higher Certificates. The system provided that the examinations of all the examining bodies should be of the same approximate standard and should be the vehicle of exemption from a wide variety of professional tests and the matriculation of universities.

THE PHASE OF REFORM

This system of a School and Higher Certificate was a great landmark in our educational history and it lasted practically without change for thirty years. As the years went by, however, the need for further reform became apparent. The School Certificate in particular tended to dominate rather than to follow the curriculum. To get a School Certificate a pupil had to pass in English Language and in five subjects taken from three out of four groups. Competence in either a Foreign Language or Mathematics was necessary. Some pupils of distinguished ability failed to comply with these somewhat artificial conditions. Furthermore, a large number of pupils never reached the stage of the School Certificate at all and were prejudiced in their search for jobs. The position was made worse because employers in their efforts to get a satisfactory credential

demanded London Matriculation, which could be obtained by a minimum number of credits in the School Certificate. It began to dawn on people that an external examination at about the age of 16 designed to test the work of pupils in the main schools was misconceived.

LONDON MATRICULATION

It may be worth while in passing to say a word about London Matriculation, because it represents a remarkable achievement and at the same time illustrates the trend of thought on school examinations in the past hundred years. Established in 1838, it was originally the entrance examination for London University. Gradually, however, its reputation grew until it became the aim of grammar school pupils not only in this country but abroad. In 1838 the number of candidates was 23; a hundred years later it was over 7,000. Examination centres were set up in all parts of the British Commonwealth. In 1951 the examination as an independent test for external students was brought to an end, by which time the number of candidates examined had come within reach of half a million. The examination played an immense part in educational history and its disappearance is symptomatic of the new outlook on school examinations.

THE GENERAL CERTIFICATE OF EDUCATION

As in other directions it was the Second World War which brought the change. Soon after war began, a Committee under the late Sir Cyril Norwood was set up to review the whole question of school examinations. Its conclusions were never carried out in terms, but it laid the foundation of a new system introduced after the war. The features of the new system were three:

1. The School and Higher Certificates were replaced by an examination called the General Certificate of Education, which could be taken at three standards—ordinary, advanced and scholarship.
2. The General Certificate was to be a subject examination, not a certificate achieved by success in a group of subjects.
3. The General Certificate should be taken as late as possible in the school career; the age of 17 was proposed as the minimum age, but in fact it turned out to be 16.

The G.C.E. was a great reform, but it was only symptomatic of a new outlook on the whole question of examinations—an outlook of uneasy scepticism. We have seen earlier in this paper that, since 1870, admission to the higher grades of the Civil Service had been by competitive examinations. Some people, like Trollope, doubted whether this was the best method of selection and the experiences of the war brought into prominence another method. Candidates were assembled for a week-end and subjected to various tests designed to gauge their powers of invention, their standards of behaviour and their personal characteristics. The new system was fully tried out at Stoke d'Abernon and on the whole was very successful. It was decided, however, to have the two systems

running side by side. So it has come about that to-day candidates for the Civil Service have two methods of admission:

1. The first method consists of a written examination similar to a university honours examination together with a preliminary and final interview.
2. The second and alternative method consists of a short written examination in general subjects and, for selected candidates, a series of tests and interviews at the Civil Service Selection Board lasting two or three days and an interview before the Final Selection Board.

These two methods are at present running side by side and it is premature to reach a definite conclusion about their respective merits. It is, however, interesting and significant that in the Civil Service, traditionally the blue ribbon of competitive examinations, the wheel has gone full circle and we have re-introduced a method not unlike that which operated a hundred years ago.

THE PRESENT PICTURE

With these preliminary remarks let us attempt to review the present situation and see whether we can deduce any tendencies in the field of examinations. We shall probably find it most convenient to follow the career of the average school boy or girl as he or she passes through the educational machine.

Compulsory education in this country begins at five years of age and so far no one has suggested external examinations during the infant and primary stage which lasts for six years. For most children the first hurdle comes at the age of about 11. In the early years of the century admission to a grammar school from a primary school was by examination and an element of keen competition was introduced by the requirement imposed by the Liberal Government in 1906 that every grant-aided school should offer 25 per cent of free places to ensure that able boys and girls of small means might enjoy higher education. The system worked reasonably well, but it was open to two major objections. In the first place it subjected young children to the trials of an external examination at an age when they were ill-suited to cope with it. In the second place it elevated the grammar schools to a position of intellectual and social superiority and thus condemned the elementary schools to an inferior status. These objections were not removed in spite of the growth in the number of grammar schools and the percentage of free or special places, and it was not until the Butler Act of 1944 was passed that a more sensible system emerged. Under the Act pupils about the age of 12 were to be classified according to their abilities and aptitudes. The intellectually-minded child would fit suitably into a grammar school; the mechanically-minded child into a technical school; the ordinary run of children with a healthy interest in their physical environment but with no pronounced bent, into a modern school. It has been claimed by some —not without reason—that this process of selection is easier in a comprehensive school where all types of school are combined in a single whole under a single roof. It is fundamental to this new system of selection at the age of 12 that it shall not be done by competition, and the principle is undoubtedly right. The

precise way in which children are to be selected is still being worked out and it cannot be perfected until there are sufficient schools of good standard for all children. But our generation can claim credit for having adopted the principle that the education of young boys and girls shall no longer be settled by a competitive test involving strenuous preparation and a great deal of anxiety and frustration.

So much for the boys and girls who pass from State primary to secondary schools—the great majority of the child population. But there is an important minority who go to preparatory schools and at the age of about 13 pass to the public schools, usually for a boarding education. Here the picture is not so rosy. We have seen that in the 'sixties of the last century, as a result of the Public Schools Commission, all scholarships were put on a competitive basis. The result of this was that the public schools became inbred; to enter a public school a child had to be born of rich parents or had to have outstanding intellectual gifts which could only be trained at a preparatory school with high fees.

In 1944 the Report of the Fleming Committee endeavoured to put this right. It proposed a system by which qualified pupils educated in State schools as well as others should be admitted to public schools on the results of an interview, at fees graduated according to the parents' income. The scheme was not entirely novel and, if it could have been carried out, it would have done much to remove the stigma of class-consciousness from the public schools and would have brought boarding education within the reach of the great mass of children. It is unfortunate that nothing has been done to carry out the Report in spite of the fact that 12 years have gone by and six Governments have been in office. Half-hearted attempts have been made to interest the local education authorities but the results have not been impressive.

From the age of about 12 onwards, boys and girls are at the stage of secondary education. For those who stay at school till 17 or 18 the G.C.E. at the ordinary or advanced level opens the door to professional employment or further education.

It is as yet too early to pronounce on the merits or demerits of the General Certificate. The scheme is still in its infancy and we are at the experimental stage. To some it seems unfortunate that at this stage the regulations of the Ministry and the Examining Bodies have been made so rigid. When the School and Higher Certificates were introduced in 1917, the Board of Education were justified in imposing the reform on the schools. To-day the position is quite different. It is strange that the Ministry of Education, which is so careful to avoid interfering with the curriculum, should nevertheless restrict the discretion of schools in the matter of examinations. Obviously, the conditions of school examinations must be kept under review by a body such as a Secondary School Examinations Council which, incidentally, should include as it once did representatives of the examination delegacies. For the rest, school authorities might have discretion to enter pupils at any age either for the General Certificate or for other appropriate external examinations or to devise suitable internal examinations. Unless freedom of this kind is granted competent critics see in the G.C.E. a menace to the life and curriculum of the schools. The danger of examinations is always that they may become the master instead of the servant and the danger is best avoided

by trusting the heads of schools to plan their own policy instead of having it dictated by higher authority.

In this connection there is a particular point of some interest to the Royal Society of Arts. The great majority of pupils at the secondary stage are in modern schools with a leaving age of about 16. Since the Ministry's regulations prohibit in normal cases the entry of pupils for external examinations under 16, entries for examinations like the Royal Society of Arts' school examinations cannot be made by the school. On the other hand many employers and parents demand some kind of certificate and, provided the head teacher is given discretion whether or no to enter the pupil, there does not seem that any valid objection to pupils of 15 and upwards taking such examinations. So far the policy of the Ministry as set out in Circular No. 289 shows no sign of relenting; but representations have been made from many quarters and in reply to a question in Parliament on 8th March last, the Minister undertook to consider comments on this and other points.

From the age of 16 upwards, boys and girls leave the secondary schools and go into employment or further education with the complication, for boys, of National Service. Those who enter professional life will have cleared the Preliminary examination in most cases through the General Certificate. But a very large and growing number go into the technical colleges or direct into industry. For them, there is the opportunity of working for National Diplomas or Certificates or for College Diplomas and these awards are a most admirable product of our modern educational system, combining as they do the merits of an internal examination with the advantage of external assessment. It would be impossible, in the time available, to review the opportunities for technical students, but the whole subject has recently been reviewed in a White Paper issued by the Minister of Education (Cmd. 9703—price 1*s.* 6*d.*).

There is, however, one field of further education which must be noticed, since it illustrates clearly the tendency in our generation to depart from highly selective competition and to bring within the range of qualified students the opportunities of higher education at a cost graduated according to the means of their parents. Most of us can remember the time when a university education, like a public school, was the privilege of the wealthy or that small minority which could win a scholarship in fierce open competition. The introduction in 1922 of 200 State Scholarships was a step towards a new and better system and by 1935 about forty per cent of all university students were assisted in some way from public funds. That figure has now risen to over seventy per cent in spite of the greatly increased size of universities. These awards, partly in the form of State Scholarships and partly from local or other funds, are available to all students capable of matching an honours course and the days are past when it could be said that really promising students could be prevented by lack of means from their heritage of a university education.

THE FUTURE OF EXAMINATIONS

We have seen that from the Middle Ages down to the eighteenth century the function of examinations remained more or less unchanged. Their business was

to test the candidates: to determine whether or no they matched a qualifying standard. The element of competition did not enter in. The fierce demand for education which began in the late eighteenth century and increased in the Victorian age changed the picture. Education lagged behind the demand; schools could not be built fast enough. Competition was in the air and it became part of the nation's creed that the prizes should go to those who had beaten their competitors in keen and unrestricted competition.

With the advent of the present century and the changes brought about by two world wars, the scene altered once again. The principle of the Welfare State is that boys and girls have a right to education suitable to their aptitudes and abilities. Schools are being provided in sufficient numbers to meet the demand and the need for competition is fast disappearing.

Meantime, too, there is a new outlook on school examinations. No longer do we find it necessary to pull up the plants and see how they are growing. External examinations are to be a test of qualifications for professional employment or further education.

At the university stage, as at the school stage, access is open to all who can make the grade. The only limiting factor which involves competition is the number of places available. Thus, our educational system is suiting itself to the school needs of our age and there is no longer any need to fight for what should be the birthright of every citizen in a free nation.

We can, therefore, sum up the situation in a few propositions as follows:

a. The purpose of examinations is to measure the qualifications of the candidates in particular skills.

b. The competitive element is fast disappearing as the educational system becomes more complete.

c. In the early stage of school, up to about the age of 13, external examinations are generally inappropriate.

d. In the secondary stage of education, from about 13 to 19, much has been done to reform the examination system but much remains to be done. Probably, examinations will tend in the direction of internal tests with some form of external assessment.

e. During the present stage of experiment and of trial and error, as much freedom as possible should be left to the schools and rigid directions by higher authorities should be avoided.

f. Access to the normal facilities of education including the public boarding schools and the universities, should be open to qualified pupils without the need for competition or the possession of wealth. The precise nature of the test for admission should be the subject of experiment and research.

g. Speaking generally, competitive examinations should be relegated to the highest stages where the prizes are few and the rewards justify the struggle.

To some it may seem that we are taking things too easy: that we are eliminating from life the struggle for existence and the survival of the fittest. It may be so; but that is the price we pay for outgrowing our forefathers. We have gone too

far to turn back if we wished to. But if the Welfare State means anything it is clear that we shall not wish to.

But for those who still believe in competitive examinations: who hold with John Morley that we are too prone to accept the lazy doctrine that men are much of a muchness, there is some comfort. Although competition may be disappearing in our educational life, as indeed it is disappearing to some extent in our industrial and commercial life, there are still many fields in which it cannot be eliminated. The open prizes and scholarships at the university and in academic life are still fought for in fierce competition. It is fast becoming an accepted axiom that education is the birthright of every boy and girl, but the axiom implies that there are sufficient schools and universities to satisfy the needs of the nation. No one has yet suggested that there should be enough Porson prizes or Craven Scholarships to go round. At this stage of education we can wholeheartedly agree with Pope's lines:

> Order is heaven's first law: and, this confest,
> Some are and must be greater than the rest.

CONCLUSION

In conclusion let us try to give a simple answer to the question posed in the title of this paper. Do we still need examinations? The answer is 'Yes', but to a greatly diminished extent, since the expansion of our educational system is making competition unnecessary and out of date. The function of examinations in the future will be to fit the right pegs into the right holes and for this purpose written examinations by themselves are a poor instrument. We have yet to find the right technique, but we may assume that it will include these elements:

(i) A qualifying test in writing or otherwise;

(ii) a personal interview;

(iii) a report of previous progress by the candidates' own teachers.

How exactly these three elements are to be combined we cannot at present say. Very probably they will vary according to the purpose of the examination and the age of the candidates. But a great deal of research will be needed before we can be said to have mastered the subject and found a solution. At present we are like Alice and the Cheshire cat.

DISCUSSION

THE CHAIRMAN: It looks as if Sir Griffith has dealt with everything so fully that there are no questions for him to answer. There is one point that I would like to emphasize: that the Society's examinations are not competitive. There is no fixed number or percentage of passes, they are designed to certify a specific standard, one which is recognized nationally, perhaps internationally, as they are now held in many parts of the Commonwealth. The only possible competition connected with the examinations is the award of medals to the best candidates in each subject, and this year, the centenary of the Society's examinations (I hope you will note that, 100 years we have been conducting these examinations), we are also offering special centenary prizes in the form of money prizes and a specially inscribed certificate to the best

candidate in certain subjects, or groups of subjects. But the experience of the Society has been that examinations can help in the development of education as well as certification standards. The Society's examinations were instituted in 1856 to encourage those attending the various mechanics' institutes to get down to real study for at that time many of the institutes were degenerating into lower recreational clubs, but examinations saved them.

It remains for me on your behalf to thank Sir Griffith Williams for a most interesting paper on the subject of examinations.

A vote of thanks to the Lecturer was carried with acclamation, and the meeting then ended.

GENERAL NOTES

THE EDINBURGH FESTIVAL

There are few who would doubt that the success of the Edinburgh Festival after ten years has justified the enterprise of its sponsors, and rewarded the courage and vision of Sir John Falconer, the Lord Provost who deemed it necessary if the northern capital was to recover the prestige it enjoyed in the great days of the eighteenth century, the days of Adam, Hume, and Henry Raeburn (the bi-centenary of whose birth, it may be said, is now being celebrated with an exhibition of his imposing portraiture at the National Gallery of Scotland). But the Festival has brought its attendant problems, and the scattered, occasionally inadequate nature of its accommodation has suggested to some that the proper solution would be the conversion of the Grassmarket into a festival centre.

The drawbacks of the Empire Theatre's stage in the representation of ballet, and the inadequacy of the King's Theatre for opera, are argued in support of the costly Grassmarket plan which no doubt is very much in the mind of Mr. Robert Ponsonby, the new Artistic Administrator. In addition to such practical suggestions there are, as usual, a few ironic asides. No Festival anywhere is ever spared them; and, doubtless, visiting critics do not take very easily to a breathless succession of artistic events in what may be unfamiliar surroundings. Thus one detects an undercurrent of impatience in Mr. Shawe-Taylor's dry allusion to wet pavements: 'When we emerge from the Usher Hall it is still raining. A drink, we murmur, but are promptly baulked by the licensing laws. Like the initiates in *The Magic Flute*, we must endure the trial of water—a splendid discipline, no doubt, but in no way festive'. And after commending Dylan Thomas's play *Under Milk Wood* at the Lyceum Theatre, Mr. Kenneth Tynan observes brusquely: 'Little else of note in sooty Edinburgh's first Festival week of theatre'.

In fact, of course, professional judges of music, opera, and the drama, not to mention followers of ballet and the experimental film, have really far more cause to be grateful for a variety of highly distinguished performances at the Festival, than the visiting critic of its art exhibitions. Without the *pièce de résistance*—in late years a retrospective collection of paintings by some modern French master, invariably brought in due course to the Tate Gallery—the 'fringe' exhibitions would scarcely tempt a London critic to journey over three hundred miles north, well deserving though they may be of local patronage. But for this writer, at any rate, the renewal of old associations is sufficient inducement. Even the Braque exhibition, promising the life work of a magician regarded by many connoisseurs as France's greatest living painter, can wait, one reflects, as emerging from the Waverley Steps one surveys again that incomparable view in Princes Street, and muses on those old haunts and friends to be rediscovered. Once again one enjoyed the hospitality of a northern Fellow of this Society, Mr. Pilkington Jackson, lately elected to the

Scottish Academy, whose President, Sir William Hutchison, has just completed a distinguished portrait of Her Majesty The Queen. From these artists, and others, one gained fresh light on artistic thought north of the Border.

Outside the Scottish Academy, one of the most interesting exhibitions has been that of Lord Haig's recent landscapes at the Scottish Gallery in Castle Street. As a serious and enquiring painter, Lord Haig is respected both in London and Edinburgh, his latest canvases continuing to show his concern to emphasize the significant shapes in nature, his schematic renderings of the Border country being reconciled with a most delicate apprehension of the bleak atmosphere. With these, it was interesting to see some paintings of Hampstead, more vigorous and direct than the run of the artist's work, with two fantasies inspired by Thomas the Rhymer, and a number of admirable pen and colour wash drawings.

As for M. Georges Braque, the Scottish Academy honoured its honorary member with over eighty paintings and *collages* set amid the worthiest exhibition it could devise of members' and guests' works. Drawn from American, French and other European museums, and catalogued with scholarly care by Mr. Douglas Cooper, the Braque exhibition is being brought by the Arts Council to the Tate Gallery with the addition of a new panel *On the Wing*. The most recent canvases include two from the painter's visionary *Studio* series, the one completed last year in which still-life objects are combined with arbitrary shapes, and a large white bird introduces a mysterious element of life into the *nature morte*, representing for the artist a synthesis of his discoveries.

All that precedes it shows how logical has been his progress in the evolution of a vision. In his passionate and sensuous response to nature, and transformation of it into harmonious compositions conveying their own message, calm and unworldly, Braque reveals a mind most closely allied to a musical composer's, and an art requiring of us a similar detached contemplation. In painterly terms, his art has entailed unending research into the relationship between form and the space he has newly conceived, combined with an instructive feeling for an exquisite *matière*. Every phase is exhibited: the early transition from Impressionist to *fauve* painting seen in simplified landscapes of pinky blues, cream, and greens; the revelation of Cézanne and the development of an individual style, succeeded by the Cubist association with Picasso in which the two pioneers explored form and space 'rather like mountaineers roped together', in Braque's phrase. After the First World War comes the magnificent series of still-life studies, and so his art continues to unfold to the liberated style of to-day.

'I no longer believe in anything', Braque has said lately; 'objects do not exist for me except in so far as a harmonious relationship exists between them, and also between them and myself'. At 74 his visionary powers seem, indeed, almost as remarkable as his intellectual drive over forty years ago. Though delicate health forbade Braque's travelling north, his dark brooding eyes deep-set in a shrunken, almost Asiatic mask, could be sensed as clearly in the galleries as the authority of a life's work.

NEVILE WALLIS

THIS IS TO-MORROW

This exhibition is by an English splinter group from the international group '*Espace*' and it consists of the work of 12 groups of abstract artists (architects, sculptors and painters) working together. The exhibition is co-ordinated by Theo Crosby. The result is an enterprising lively exhibition with many viewpoints as to how this *symbiosis* should be achieved, and an excellently produced catalogue where varying views of the different groups are heralded by three introductions by art critics. It is an important exhibition and has undoubtedly caused more interest and discussion among young artists than any recent exhibition. It is difficult to summarize

its point of view, because there is a good deal of contradiction in outlook from group to group. Perhaps a 'Justification of Irrationality' could be the theme. It is a long way from 'beauty is fitness for purpose'.

The entrance exhibition is a wonderful Alladin's cave after the Whitechapel Street; it is composed of a somewhat clumsy space frame hung with transluscent coloured plastic, photographs and Hartung-like calligraphic painting—in this curious cage lives a roughened bird totem pole by Turnbull. The future is here, technical and emotional, consisting of the use of new methods and materials and rather evocative art; a fresh but not revolutionary outlook.

The next stand, with juke box and poster, mechanical man and sensory display, is funfair stuff as though part of Whitechapel was let into the exhibition by mistake, but I must say I enjoyed going through the narrow entrance-way where the floor seems at first fluorescent and then made of some sticky rubber stuff which is hard to leave. The point of view here is that to-morrow is the outcome of present-day conditioning, a sort of Orwell art view and a very possible danger: a cybernetic outlook.

The James Hull, Catleugh, Thornton group are alone in making painting modulate their form, and their painted, curved, pierced screen makes a good lead into the Jacksons' and Scanavino exhibit, where there is a lively sculptural display in the free 'Lipchitz' plaster and chicken wire style and an amusing barred cage. These good, but not very serious, sculptural exhibits and the little wall exhibition of nail-heads marching from geometric to organic order are provocative. The 'Brighton House' photograph, however, strikes a false note; and I moved with pleasure to the Anthony Hill, Denis Williams, John Ernest display of past manifestos and pure old fashioned Mondrian type of abstract sculpture.

The Paolozzi, Smithson, Henderson hut and anthropologically displayed *bric-à-brac* follows. The Smithson message seems to be: new technique and material, but old forms; the elemental shelter and patio, the Paolozzi symbols for man, machine, nature and man's nature, no doubt mean that the same impulses that acted in the past will continue into to-morrow.

The rather anarchistic display is made artistic by Eduardo Paolozzi's genius. Fragmentation and suggestion are a possible view and often a logical one. It entails the achievement of symbiotic order by contrast and not by uniformity, but I doubt whether such abstruse symbolism can be understood by many people.

The elegant Pasmore, Goldfinger, Helen Phillip interior follows in the known abstract vernacular, then the spectacular exhibition of Michael Pine who, together with James Stirling and Richard Matthews, has produced what seems like some largely magnified piece of an extraordinary new white-foamed building material. This is followed by a rather Ronchamp-like sculptural entrance by a really joint architect-sculptor-painter effort, well done by the St. John Wilson, Peter Carter, Frank Newby group (it is badly lit in the exhibition) but it is great fun, as is the Mary Martin, John Weeks group's work, but does not add very much to our understanding. Perhaps the most touching message is the humble one of Adrian Heath and John Weeks that art can transform the ordinary; they have certainly done well with their beautiful concrete block wall.

JANE DREW

BRITISH COLOUR COUNCIL

The Silver Jubilee of the British Colour Council is being celebrated this month. The activities planned include an exhibition—open from 9.30 a.m. to 4.30 p.m. on Tuesday, Wednesday and Thursday, 25th to 27th September, and from 9.30 a.m. to 12 noon on Friday 28th, and a conference, which is to be held from 24th to 26th September. Fellows of the Society will be welcome at the exhibition and may also if they wish apply for tickets for the Conference (cost three guineas).

Applications for conference tickets and programmes should be made to The British Colour Council, 13 Portman Square, London, W.1, at which address the exhibition also will be held. Admission to the exhibition will be free.

DUTCH CHILD PORTRAITS

An Exhibition of paintings of children by Dutch artists from 1550–1820, is at present on view at the Diploma Gallery of the Royal Academy, where it will remain until 30th September. The exhibition has been organized by the Arts Council in association with the Royal Netherlands Embassy in London.

The exhibition is open on Mondays, Wednesdays, Fridays and Saturdays, from 10 a.m. to 6 p.m.; on Tuesdays and Thursdays, from 10 a.m. to 8 p.m., and on Sundays from 2 p.m. to 6 p.m. Admission is *1s. 6d.*

THE DESIGN CENTRE

The third of the special displays at the Design Centre, Haymarket, entitled 'Designers at Work', was opened on 10th September and will be on view until 29th of the month. The display illustrates the work of the Council of Industrial Design's Record of Designers, from which manufacturers may obtain a short list of possible consultant or staff designers specially qualified for any given project. Actual examples of work done as a result of the Record's recommendations are included in the display which will, it is hoped, encourage an even wider use by firms of this service.

OBITUARY

LIEUTENANT-GENERAL SIR OTTO LUND

We record with regret the death, in London on 15th August, of Lieutenant-General Sir Otto Lund, K.C.B., D.S.O., Commissioner-in-Chief of the St. John Ambulance Brigade, at the age of 64.

Otto Marling Lund was educated at Winchester, and at the Royal Military Academy. After active service in two World Wars, during the first of which he received the D.S.O., he went to the War Office as Director, Royal Artillery, in which post he remained until 1946. In 1948, in which year he retired after two years as G.O.C.-in-C., Anti-Aircraft Command, he was created a K.C.B.

In the same year Sir Otto was appointed Deputy Chief Commissioner of the St. John Ambulance Brigade, and in 1950 became Commissioner-in-Chief. His yearly world tours in that capacity were of great help in extending the Brigade's humanitarian work, and also in raising its membership, in which there was an increase of some 100,000 throughout the Commonwealth during his years of office.

Sir Otto was elected a Fellow of the Society in 1953.

MR. J. W. RODGER

We also record with regret the death, in Edinburgh on 16th August, of Mr. J. W. Rodger.

John Wilfred Rodger, M.I.E.E., was born in 1887. After apprenticeship in the engineering industry, he joined Bruce Peebles & Co., in 1924, as superintendent of the transformer department. From 1946 until his death he was managing director of the firm. He was president of the Scottish Engineering Employers' Association last year, and in 1950 was vice-president of the Edinburgh Chamber of Commerce. He was also chairman of the Industrial Civil Defence Association and a governor of Heriot Watt College.

Mr. Rodger was elected a Fellow of the Society in 1939.

NOTES ON BOOKS

ERIC MENDELSOHN. *By Arnold Whittick. Leonard Hill*, 1956. 42*s*

If you are of the opinion that architectural design is no longer a field for individual expression but a complex business of technical planning and compromise best put into the hands of a team of specialists, this book will act as a stimulating reminder that the creative powers in one individual can cope with modern technical requirements and still produce personal and inspired work for, though Mendelsohn was of a previous generation, he solved problems of and in advance of our times.

The many sketches, plans, photographs of models and of finished work give a clear picture of Mendelsohn's vitality, his urge to create—and his method of working. There are pages of small 'thumb-nail' sketches, fantasies—sometimes grotesque—as he gropes into the future attempting to visualize the structures for a new civilization. It is interesting that these are invariably drawn as looking up at the Acropolis, or an Acropolis from an H. G. Wells' utopia, fantastic and romantic. Turning a page we find these have become finished structures, the Einstein Tower, a Temple and Community Centre, Missouri, or a House on Pacific Heights, and so we re-examine these little sketches with startled interest, for though they may only comprise six vigorous pen strokes they must be expressions of complex practical structures in the architect's mind.

We must thank Whittick for the chapter on Mendelsohn's method of working: how, after obtaining all relevant information by asking the client questions and writing down the answers—and this might take four hours—he would spend a long time at the site walking every inch of the ground and meditating. He would then commence designing. He designed, not from plans and elevations, but small perspective sketches. That the final buildings were often identical in massing and outline with these first sketches indicates that structural principles (often new), and interior organization, were resolved in Mendelsohn's mind at this early stage: as designing progressed he would say, 'Look at my sketch, there is everything in it'—and the sketch would not be more than two or three inches long.

He admired classical architecture, but he wrote in 1910 'I believe that a new civilization is beginning based on the great conceptions of ancient times'. Note that he referred to *great conceptions*, not detailing of cornices and pediments. He believed in and was guided by his imagination and his own code. Quote: 'He believed that no artist worth his salt would compromise with committees'; speaking to students, he said 'Many of you who sit here have talents greater than mine, but few of you will fulfil your potential greatness because you will quickly learn to compromise and settle for less than the best of which you are capable'. This question of artist's integrity, which must always be a problem with designers and architects who consider themselves more than 'business men', was no problem with Mendelsohn who refused to compromise.

Mendelsohn was remarkable in his ability to control the technical and administrative difficulties of construction and produce work which was organically whole and of fine proportions down to the smallest detail. He did not succumb to formulæ or rule of thumb but was guided by his inventive imagination throughout the whole of his life. He was amazingly productive and lived for his work, and so this story of his work is also the story of his life, first in Germany and then England, Palestine and America where, at the age of 59, he made a fresh and vigorous start in San Francisco with one of his best periods ahead of him.

This is not the place to describe Mendelsohn's works, which should be sufficiently well known and are adequately reviewed in this book which contains numerous

plans, illustrations and descriptions of Mendelsohn's best work. This volume should not be considered as only for the reference shelves, but as inspiring reading for those who design. By the way, in these days of mounting costs, this is good value in book production at 42*s*.

JAMES GARDNER

SHORT NOTES ON OTHER BOOKS

OTHER NATIONS' COLONIES. *By A. H. Stamp. Courier Printing and Publishing Co.*, 1956. 38*s* 6*d*

Colonization, and the history of the great colonial empires which have been forged by European nations other than Great Britain, form the main theme of this work, although there is also a section on the smaller colonial powers. The book is supplied with a bibliography of references and works consulted, and an index.

LANDSCAPE INTO ART. *By Kenneth Clark. Penguin*, 1956. 5*s*

Sir Kenneth Clark is concerned, in this Pelican edition of the book which first appeared in 1949 based on his first course of lectures as Slade Professor at Oxford, with man's relation to nature as reflected in the history of landscape painting. The 96 plates show examples of landscape painting from an Hellenistic *fresco* to the present century; there is an index.

FROM THE JOURNAL OF 1856

VOLUME IV. 19*th September*, 1856

REGISTRY OF CANDIDATES

The following recommendation of the Society's Board of Examiners, confirmed by the Council, was contained in a circular, part of which is reproduced below, which was issued by the Secretary and dated 1*st September*, 1856*:*

'The Board of Examiners are entirely of opinion that a great additional value would be imparted to the Certificates issued by the Society of Arts, and to the prizes awarded, were the Council to open a Public Registry of all those persons who from time to time shall obtain the Society's Certificates, and shall be desirous to procure employment. Through such a Registry the Council would be enabled to afford to employers precise and accurate information—the result of a prolonged and searching inquiry—as to the attainments and intellectual ability of any of their certificated candidates'.

The importance of a Registry of this kind, if freely used by the public, can scarcely be overrated. To employers, who may wish to secure the services of intelligent and industrious young men, it will afford a precise and in most cases an unerring test of the actual attainments and ability of those persons whose names appear on the register. They must all possess a certain amount of industry, intelligence, and acquirement; for no one will be permitted to place his name on the register who shall not have obtained at least one Certificate at the Society's Examinations. The Registry will be so arranged as to give the name, age, place of residence, previous occupation, employer if any, and the subjects in which Certificates have been granted. Employers who take an interest in the progress of National Education, and who desire to encourage habits of self-instruction and of steady application in the young men of England, are invited to avail themselves of the facilities which will be afforded them, free of charge, by the Society of Arts' Registry. Every appointment thus filled will not only have rewarded some industrious and deserving young person, but will stimulate many others to enter on and persevere in a course of patient labour for their self-improvement.